UNIVERSITI PUTRA MALAYSIA

SUPPLY RESPONSE OF SUDAN'S COTTON INDUSTRY: IMPLICATIONS OF GOVERNMENT INTERVENTION

SALAH MOHAMED ELAWAD SALIH

FEP 2001 6

SUPPLY RESPONSE OF SUDAN'S COTTON INDUSTRY: IMPLICATIONS OF GOVERNMENT INTERVENTION

By

SALAH MOHAMED ELAWAD SALIH

Thesis Submitted in Fulfilment of the Requirement for the Degree of Doctor of Philosophy in the Faculty of Economics and Management Universiti Putra Malaysia

February 2001

Dedication

To my parents, brothers, sisters, wife and sons

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy.

SUPPLY RESPONSE OF SUDAN'S COTTON INDUSTRY: IMPLICATIONS OF GOVERNMENT INTERVENTION

By

SALAH MOHAMED ELAWAD

Feburary 2001

Chairman: Eddie Chiew Fook Chong, Ph.D.

Faculty: Economics and Management.

Sudan's cotton industry has assumed a key role since the mid 1920's in its national economic development both on economic and social grounds. This study addresses the issues of government intervention on Sudan's cotton industry. Control measures in the cotton industry which span area determination, cotton producers' price determination, cotton exchange rate and cotton tax rate, are believed to have negative impacts on the cotton industry supply response. The major objective of this study is to investigate the implications of government intervention on cotton industry. The study employs an econometric approach to examine the behavior of the cotton supply response. The study uses time series data over the period 1969 - 1998. The long and medium staple cotton models incorporate five equations, namely area, yield, export supply, producers' price and export demand. The model equations have been structured to allow for a balanced representation of both price and non-price factors. The models have been estimated using the auto-regressive distributed lag technique and error correction model. The study employs Theil's inequality and root mean square percentage error as validation techniques to ascertain model

performance. A simulation of alternative policy scenarios with regard to cotton exchange rate and cotton tax rate was carried out to assess the impact of policy reforms on the magnitude of the endogenous variables. In addition, a simulation of the policy scenario with regard to food self-sufficiency as a policy objective was also conducted.

The findings of the study support the view that government interventions on Sudan's cotton industry have had negative implications on the cotton supply function components, namely, area and yield. The various forms of government intervention have had, on the whole, undermined the provision of adequate incentives to cotton producers and as such have resulted in the lack of responsiveness on part of the cotton producers to changes in the cotton world market. Such a situation has deprived the country of its inherent comparative advantage as cotton producer. The study recommends corrective policy reforms in relation to producers' price determination mechanism and its associate variables mainly cotton exchange rate and cotton taxation. Moreover, non-price policy variables, which are mainly of technological nature, have to be appropriately considered in cotton production planning process in order to elucidate positive supply response.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah.

GERAK BALAS BEKALAN BAGI INDUSTRI KAPAS NEGARA SUDAN: IMPLIKASI INTERVENSI KERAJAAN

Oleh

SALAH MOHAMED ELAWAD

Februari 2001

Pengerusi : **Eddie Chiew Fook Chong, Ph.D**

Fakulti : **Ekonomi dan Pengurusan**

Semenjak pertengahan tahun 1920-an industri kapas Sudan telah memainkan peranan penting dalam ekonomi negara atas asas ekonomi maupun sosial. Kajian ini menjurus pada isu intervensi kerajaan terhadap industri kapas negara Sudan. Langkah-langkah kawalan terhadap industri kapas iaitu yang meliputi penentuan kawasan, penentuan harga pengeluar kapas, kadar pertukaran kapas dan kadar cukai kapas, dipercayai memberi impak yang negatif pada gerak balas bekalan industri kapas. Objektif utama kajian ini adalah untuk menyelidiki implikasi intervensi kerajaan terhadap industri kapas, dan ini dilakukan dengan menggunakan pendekatan ekonometrik dalam usaha meneliti kelakuan gerak balas bekalan kapas. Kajian ini menggunakan data siri masa merentasi jangka masa dari tahun 1969 hingga 1998. Sebuah model telah dibina merangkumi lima persamaan untuk kedua-dua kapas asasi panjang dan sederhana panjang, iaitu kawasan, hasil, bekalan eksport, harga pengeluar dan permintaan eksport. Persamaan model telah dibina bagi memperlihatkan keseimbangan kedua-dua faktor harga dan bukan harga yang

memberi kesan pada variable endogen. Model tersebut telah teranggar dengan aplikasi teknik lat teragih autoregresif dan model pembetulan ralat. Kajian ini menggunakan ralat peratusan ketaksamaan dan punca min ganda dua Theil sebagai teknik pengesahan untuk memastikan prestasi model. Simulasi senario alternatif dasar berkaitan dengan dua instrumen dasar iaitu kadar pertukaran kapas dan kadar cukai kapas telah dilaksanakan dengan tujuan menilai kesan reformasi dasar terhadap variable endogen dalam kajian. Sebagai tambahan, simulasi senario satu dasar berkaitan mampu diri mekanan sebagai objektif dasar telah juga dijalankan. Penemuan kajian ini menyokong pendapat bahawa intervensi kerajaan dalam industri

Kapas Sudan membawa implikasi negatif bagi komponen fungsi bekalan kapas, khususnya kawasan dan hasil. Dengan itu, kesan buruknya terhadap gerak balas bekalan kapas telah dipastikan. Pada keseluruhannya, pelbagai bentuk intervensi kerajaan telah mengurangkan wujudnya insentif yang memadai di kalangan pengeluar kapas. Justeru itu, perkara ini telah mengakibatkan kekurangan gerak balas bagi pihak pengeluar berkaitan perubahan dalam pasaran kapas dunia. Situasi begini merugikan negara dari kebaikan bandingan yang agak besar sebagai pengeluar kapas. Sebagai langkah pembetulan, kajian ini mencadangkan reformasi dasar berkaitan dengan mekanisme penentuan harga pengeluar dan variabel berhubung dengannya terutamanya kadar pertukaran kapas dan pencukaian kapas. Tambahan pula, varibel dasar bukan harga yang sebahagian besarnya bersifat teknologi, perlu dipertimbangkan sewajarnya dalam perancangan penghasilan kapas untuk menjana gerak balas bekalan yang positif.

ACKNOWLEDGEMENTS

Thanks to ALMIGHTLY ALLAH the most merciful, benevolent and beneficial, who has enabled me to complete this work and by the grace of His Holy Prophet MOHAMAD, (peace be upon him) who is forever a source of enlightenment, guidance and knowledge for humanity as a whole.

At the very outset, I would like to express my heartiest and sincere gratitude to my supervisor Associate Professor Dr. Eddie Chiew Fook Chong, Faculty of Economics and Management UPM, for his untiring and inspiring guidance, patience and close supervision throughout the period of my study.

I would like to sincerely and earnestly record my indebtedness to Professor Dr. Mad Nasir Shamsudin, Head of the Department of Agribusiness and Information System, Faculty of Agriculture, UPM, and a member of the supervisory committee, for his advice, guidance, critical assessment and useful suggestions during the entire course of this study. I would also like to thank Associate Professor Dr. Zainal Abidin Mohamed, Department of Agribusiness and Information System, Faculty of Agriculture, UPM, a member of the supervisory committee, for his advice and supervision.

I must thank Professor Alan John Webb, a former member of the supervisory committee, for his learned suggestions and cooperation at the initial stage of this study.

I wish to thank my colleagues and friends in Malaysia who have extended assistance to me whenever it was needed throughout my stay, especially my friends Hashim, Abdelrahim, Abdullah, Belal, Taufiq and Huson.

I will forever be grateful and be indebted to my affectionate parents, brothers and sisters for their blessings and encouragement. They have always motivated me to accomplish my goals.

I am greatly indebted to my wife Sumiya and my beloved sons Mohamed, Muaz and Mugtaba for their patience and sacrifices especially during the last two years when I am completing this study.

Last but not least, I would like to express my deepest gratitude to the Government of Sudan and University of Khartoum (Sudan) for their support.

I certify that an Examination Committee met on 16th February 2001 to contract the final examination of Salah Mohamed Elawad Salih on his Doctor of Philosophy thesis entitled "Supply Response of Sudan's Cotton Industry: Implications of Government Intervention" in accordance with Universiti Partanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the examination committee are as follows:

ABDUL AZIZ ABDUL RAHMAN, Ph.D.
Professor
Department of Economics
Faculty of Economics and Management
Universiti Putra Malaysia
(Chairman)

EDDIE CHIEW FOOK CHONG, Ph.D.
Associate Professor
Department of Hospitality and Recreation
Faculty of Economics and Management
Universiti Putra Malaysia
(Member)

MAD NASIR SHAMSUDIN, Ph.D.
Professor
Department of Agribusiness and Information System
Faculty of Agriculture
Universiti Putra Malaysia
(Member)

ZAINAL ABIDIN MOHAMED, Ph.D.
Associate Professor
Department of Agribusiness and Information System
Faculty of Agriculture
Universiti Putra Malaysia
(Member)

ZULKEFLI SENTERI, Ph.D.
Associate Professor
Department of Agricultural Economics
Faculty of Economics and Management
Universiti Kebangsaan Malaysia
Idependent Examinar

MOHD. GHAZALI MOHAYIDIN, Ph.D.
Professor/ Deputy Dean of Graduate School,
Universiti Putra Malaysia
Date: 7 MAR 2001

This thesis submitted to the Senate of Universiti Putra Malaysia has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy.

MOHD GHAZALI MOHAYIDIN, Ph.D.
Professor
Deputy Dean of Graduate School
Universiti Putra Malaysia

Date:

DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations, which have been acknowledged. I also declare that this thesis has not been previously or currently submitted for any other degree at UPM or any other institutions.

Salah

SALAH MOHAMED ELAWAD SALIH

Date: 7.3.2001

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

HA	Hectare
GDP	Gross Domestic Product
IMF	International Monetary Fund
IFS	International Financial Statistics
LSC	Long Staple Cotton
LS	Sudanese Pound
MFEP	Ministry of Finance and Economic Planning
MSC	Medium Staple Cotton
SAPs	Structural Adjustment Programs
SCC	Sudan Cotton Company
T	Ton
USD	United States Dollar

CHAPTER 1

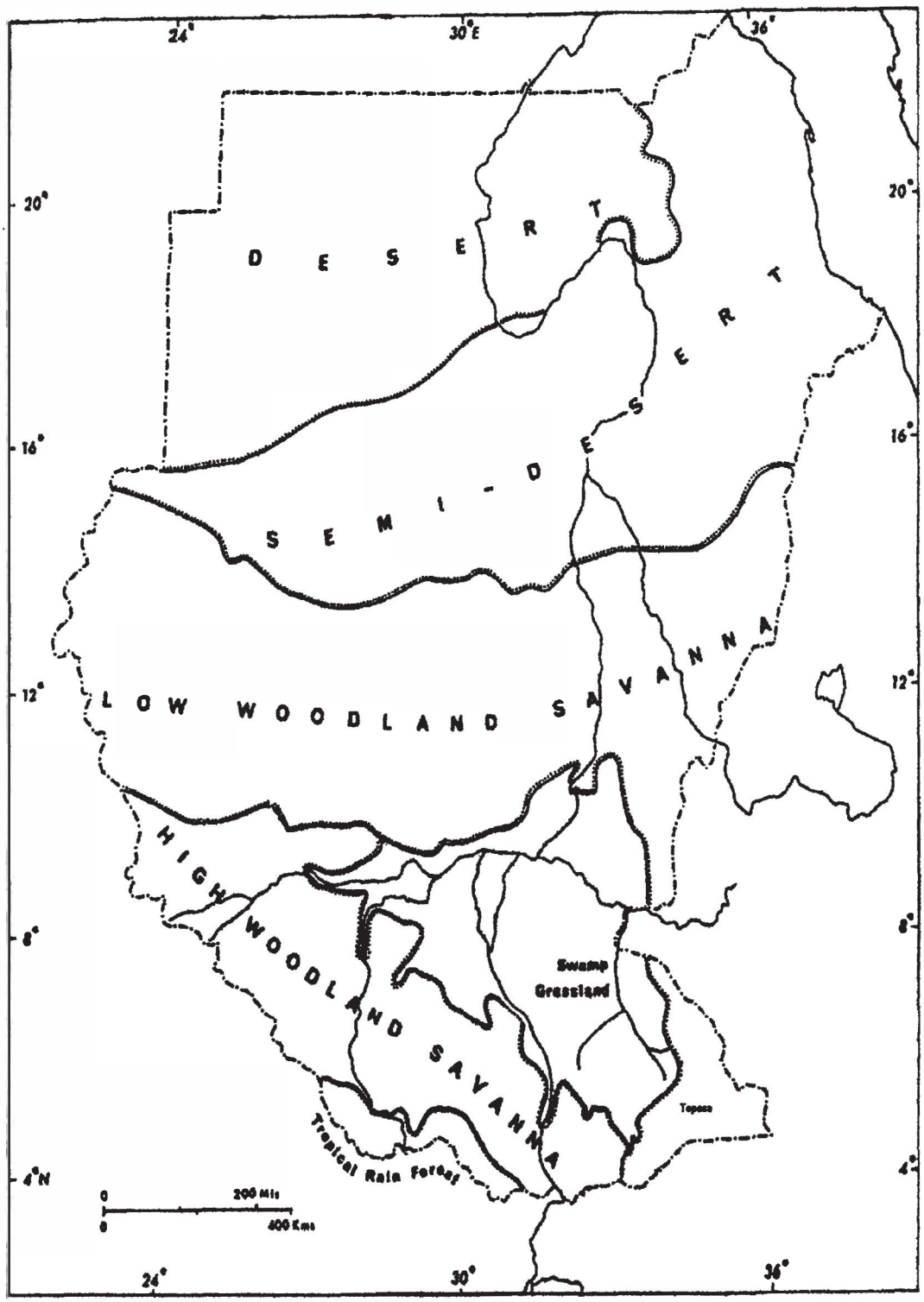
INTRODUCTION

1.1 Background

Sudan is the largest African country in size with an area of approximately 2.5 million sq. km, situated between latitudes 4°N and 22°N and longitudes 21°E and 39°E. It is entirely land - locked with 550 kilometers of red sea coast. However, it comprises large diverse ecological zones, ranging from desert in the North, to high woodland Savanna zone in the South as shown in Figure 1.1. The figure shows Sudan's ecological zones.

The central part of the country is a vast plain which traverses from south to north by the River Nile and its tributaries and interrupted by widely separated mountains and hilly areas. North of latitude 15°N lies a bout one-third of the country, which is either desert or semi-desert with an average rainfall varying from 0 to 400 mm. In this zone crop production is mainly by irrigation. A central low woodland Savanna zone, extending from latitude 15°N to 10°N, has an average rainfall ranging between-400mm to 750mm and covers about half of the country. South of latitude 10°N lies the southern high woodland Savanna zone, which has an average rainfall varying from 750mm to 1500mm. However, such an amount of rainfall is considered adequate for growing all tropical crops.

Figure 1.1: Sudan's Ecological Map



Source: Lobez (1958)

1.2 The Economy of Sudan

Sudan has huge economic potential as seen in its arable land, grazing land, water and human resources. It estimated that out of the total area of 250 million hectares, 35 million hectares are arable land, 101 million hectares grazing land, and 24 million hectares are forestland as shown in Table 1.1 which detailed Sudan's land classification. However, only about 12 million hectares are currently under cultivation.

The river Nile is the primary source of water for irrigation in Sudan, although surface water from other rivers and groundwater are also used in some areas away from the Nile. According to the 1959 Nile water agreement between Sudan and Egypt, the annual share of Sudan from river Nile is about 18.5 billion cubic meters. There are a large number of small rivers outside the Nile basin with an estimated annual run-off of about 7 billion cubic meters. In addition to the surface water, Sudan has ground water reserves estimated at about 4 billion cubic meters.

Compared to its land and water resources, Sudan is relatively sparsely populated with an average of 9 inhabitants per square kilometer. Sudan's population is estimated to be approximately 26 million in 1993 and expected to be growing at an annual rate of 2.6 percent.